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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/555,713

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EXAMINER

PHAM, THANH V

ART UNIT

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/555,713	Applicant(s) HAUSNER ET AL.	
	Examiner THANH V. PHAM	Art Unit 2894	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 21 December 2010.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 18-29 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 18-29 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 12/21/2010 has been entered.

Claim Rejections - 35 USC § 103

2. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.
3. Claims **18-27** are rejected under 35 U.S.C. 103(a) as obvious over applicant's admitted prior art in combination with Schiller WO 01/000523 A1 (provided by applicant), Tomonari et al. EP 0 599 364 A2 (provided by applicant) and US Pub. 2003/0118076 A1 (herein after '076) and/or US 6,294,787 B1 (herein after '787), both, to Schieferdecker et al.

Re claim **18**, the applicant's admitted prior art discloses in instant fig. 11 a radiation sensor comprising:

- a support 111 comprising silicon and/or GaAs and/or a semiconductor material;
- a cavity 112 which may be a recess or a through hole formed in one surface of the support 111;
- a dielectric membrane 113 provided on the one surface of the support 111;

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a radiation sensor element 114 formed above the cavity 112;

electric terminals 115 for the sensor element 114, characterized in that:

the side wall of the cavity 112 is essentially orthogonal to the support surface.

The applicant's admitted prior art discloses substantially all of the claimed invention.

The applicant's admitted prior art does not disclose the cavity in the surface of the support has a round or oval contour, the cavity is formed through dry etching, and an etching stop layer is formed on the one surface of the support between the one surface of the support and the dielectric membrane.

The Schiller reference discloses in the abstract “the devices ... are not limited to, pressure sensors, vibration sensors, accelerometers, gas or liquid pumps, flow sensors, resonant devices, and infrared detectors”; page 8 teaches both wet or dry etching techniques can be used to form the void with the sacrificial material 30 formed in between the diaphragm and the substrate body as an etching stop layer; page 14 discloses “the conductive layers 252a and 252b are preferably configured to efficiently excite the fundamental vibration mode of the diaphragm layer 240 suspended over the void 270”.

The Tomonari et al. reference discloses in col. 10

“the thermally infrared absorbing film 13G is initially form on one surface of the silicon substrate 12G with a silicon oxide film or a multilayered film of silicon oxide film and silicon nitride film, ... In order to reduce the internal stress of this thermally infrared absorbing film 13G, it is preferable to adopt a multilayered structure of holding the silicon oxide film of 5,000 thick between both upper and lower silicon nitride films of 500 thick, i.e., a sandwich structure of the films”

Tomonari et al.'s fig. 46 and the corresponding passage in col. 15, lines 10-18 discloses the thermally infrared absorbing multilayered film of nitride/oxide/nitride of silicon. Fig. 57 discloses a "rounded at respective corners" cavity and fig. 59 discloses a rounded corners or circular cavity; fig. 63 discloses an unnamed element on top of element 18R that could be considered as lens or mirror, and a 'housing' 18R. The lowest layer of the multilayered dielectric film disclosed by Tomonari et al. could be considered as the etching stop layer being "formed on the one surface of the support between the one surface of the support and the dielectric membrane".

Both Schieferdecker et al. references disclose different shapes of the cavity in formed sensor device.

It would have been obvious to one of ordinary skill in the art at the time of the invention to provide the structure of applicant's admitted prior art with different shapes of the cavity with round or oval contour to "prevent the distortion and damage which likely to occur at corner portions" as taught by Tomonari et al. (col. 15, lines 45-57) and an etching stop layer "in order to reduce the internal stress" (Tomonari et al.'s col. 10).

In other words, to employ different shapes for the void/cavity in the structure of a radiation sensor would have been obvious to one of ordinary skill in the sensor forming art as the different shapes would be selected in accordance with the sensor as taught by Schiller and Tomonari et al. It would have been obvious to one of ordinary skill in the art at the time of the invention to provide the sensor structure with different shapes as taught by Schieferdecker et al. Different shapes for the cavity is well known to those skilled in the art.

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The claim recites "the cavity is formed through dry etching", besides the fact that the Schiller reference disclosure of both wet or dry etching techniques can be used to form the void, while not objectionable, the Office reminds applicant that "product-by-process" limitations in claims drawn to structure are directed to the product, per se, no matter how actually made. *In re Hirao*, 190 USPQ 15 at 17 (footnote 3). See also, *In re Brown*, 173 USPQ 685; *In re Luck*, 177 USPQ 523; *In re Fessmann*, 180 USPQ 324; *In re Avery*, 186 USPQ 161; *In re Wethheim*, 191 USPQ 90; *In re Marosi et al.*, 218 USPQ 289; and particularly *In re Thorpe*, 227 USPQ 964, all of which make it clear that it is the patentability of the final product per se which must be determined in a "product by process" claim, and not the patentability of the process, and that an old or obvious product produced by a new method is not patentable as a product, whether claimed in "product by process" claims or otherwise. Note that applicant has the burden of proof in such cases, as the above case law makes clear. Thus, no patentable weight will be given to those process steps which do not add structural limitations to the final product.

Re claim 19, in the combination, the applicant's admitted prior art discloses the support 111 has a rectangular ad particularly a square contour.

Re claim 20, in the combination, a radiation sensor according to claim 19, characterized in that one or more electric terminals are provided in a corner section of the sensor (applicant's admitted prior art's 115a, 115b; Schieferdecker et al. '076, fig. 7/55,57, e.g.).

Re claim 21, in the combination, a radiation sensor according to claim **18**, characterized in that the sensor element is a thermopile (Schieferdecker et al. '076, [0052], e.g.).

Re claim 22, in the combination, a radiation sensor according to claim **18**, characterized in that a plurality of sensor elements are formed above one cavity (Schieferdecker et al. '076, fig. 8 or '787, figs. 2-3 and 5, e.g.).

Re claim 23, in the combination, a radiation sensor according to claim **18**, characterized by one or more of the following features:

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the membrane material comprises a dielectric, particularly silica and/or silicon nitride (Schieferdecker et al. '787, figs. 2-3/51; '076, fig. 9/111, e.g.);

under the membrane an etching stop layer containing an oxide, particularly silica, is provided (Schieferdecker et al. '076, fig. 9/113, 14, [0051], e.g.); and

the support material contains silicon and/or GaAs and/or a semiconductor material (Schieferdecker et al. '076, [0060], e.g.).

Re claim 24, in the combination, a radiation sensor according to claim **18**, disclose following dimensions:

support height H: more than 50 μm , preferably more than 200 μm , less than 1,500 μm , preferably less than 600 μm (Schieferdecker et al. '076, [0024]; '787, col. 5, line 38, e.g.);

support edge length L: less than 2 mm, preferably less than 1.5 mm (Schieferdecker et al. '076, [0008]; '787, col. 6, lines 10-13, e.g.);

cavity diameter D: more than 55%, preferably more than 65% and/or less than 90%, preferably less than 80% of the support edge length (Schieferdecker et al. '076, [0025], e.g.); and

membrane thickness D: less than 3 μm , preferably more than 0.1 μm (could be made in accordance with the provided dimensions).

Re claim 25, in the combination, a wafer comprising a plurality of cavities for radiation sensors as in any one of the preceding claims formed on it, characterized in that the cavities are arranged on the wafer in a rectangular, rhombic, triangular or hexagonal grid (Schieferdecker et al. '787, col. 4, lines 15-28, e.g.).

Re claim 26, in the combination, a sensor array comprising a plurality of radiation sensors according to claim **18** (Schieferdecker et al. '787, col. 4, lines 15-28, e.g.).

Re claim 27, in the combination, a sensor array according to claim 26, characterized in that a plurality of radiation sensors are arranged in two or more rows and in two or more columns (Schieferdecker et al. '787, col. 4, lines 15-28, e.g.).

Re claims 28-29, in the combination, a sensor module comprising: a radiation sensor according to claim 18, in addition to instant specification's page 9 that "standard housing" has a radiation window, the Tomonari et al. reference discloses in fig. 63 a housing 18R in which the radiation sensor is accommodated; an optical window in the housing; electric terminals protruding from the housing, said electric terminals being connected to the terminals; and an optical projection element, particularly a lens or a mirror.

Because it is known as standard, one of ordinary skill in the art at the time of the invention to provide the structure of the combination with known art housing with window and electric terminals protrudes from the housing.

Conclusion

4. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

5. Any inquiry concerning this communication or earlier communications from the examiner should be directed to THANH V. PHAM whose telephone number is (571)272-1866. The examiner can normally be reached on M-T (6:30-5:00).

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kimberly D. Nguyen can be reached on 571-272-2402. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/THANH V. PHAM/

Primary Examiner, Art Unit 2894